C L A I M S

1. A processing apparatus characterized by comprising:

a vessel which accommodates a target object;

ultraviolet light-generating means for outputting ultraviolet light or vacuum ultraviolet light toward an atmosphere containing radicals in said vessel;

ultraviolet light-receiving means for receiving the ultraviolet light or vacuum ultraviolet light passing through the atmosphere; and

analysis control means for obtaining a density of the radicals in the atmosphere on the basis of an output signal from said ultraviolet light-receiving means, to control a process parameter.

2. A processing apparatus according to claim 1, characterized in that

said analysis control means obtains an attenuation amount of the ultraviolet light or vacuum ultraviolet light passing through the atmosphere on the basis of the output signal from said ultraviolet light-receiving means, and obtains the density of the radicals in the atmosphere from the attenuation amount.

3. A processing apparatus according to claim 1, characterized by comprising:

means for intermittently outputting the ultraviolet light or vacuum ultraviolet light toward the

atmosphere and outputting an ultraviolet light presence/absence signal indicating presence/absence of the ultraviolet light or vacuum ultraviolet light; and

means for obtaining a difference calculated by subtracting a light reception amount of said ultraviolet light-receiving means obtained when the ultraviolet light or vacuum ultraviolet light is absent from a light reception amount of said ultraviolet light-receiving means obtained when the ultraviolet light or vacuum ultraviolet light is present on the basis of the ultraviolet light presence/absence signal, and obtaining the density of the radicals in the atmosphere from the difference.

4. A processing apparatus according to claim 1, characterized by comprising means for causing the ultraviolet light or vacuum ultraviolet light output from said ultraviolet light-generating means to pass through a plurality of optical paths and to be received by said ultraviolet light-receiving means.

5. A processing apparatus according to claim 4, characterized by comprising modulators arranged to said optical paths respectively and having modulation frequencies that are different from each other.

6. A processing apparatus according to claim 1, characterized in that

said vessel has a window through which the ultraviolet light passes, and

said window is heated.

7. A processing apparatus according to claim 1, characterized in that

said vessel has a window through which the ultraviolet light passes, and

said window has a cylindrical structure.

8. A processing apparatus according to claim 1, characterized by comprising:

temperature measuring means for measuring a temperature of molecular or atomic radicals in the atmosphere, and

said analysis control means controls the process parameter on the basis of the output signal from said ultraviolet light-receiving means and a measurement result of said temperature measuring means.

9. A processing apparatus according to claim 8, characterized in that said temperature control means includes

laser beam generating means for generating a laser beam toward the atmosphere,

laser beam receiving means for receiving the laser beam passing through the atmosphere; and

analysis means for obtaining an attenuation amount spectrum of the laser beam passing through the atmosphere on the basis of an output signal from said laser beam receiving means, and obtaining a temperature of molecular or atomic radicals in the atmosphere from a

pattern of the attenuation amount spectrum.

10. A processing apparatus according to claim 9, characterized by comprising:

means for intermittently outputting the laser beam toward the atmosphere and outputting a laser beam presence/absence signal indicating presence/absence of the laser beam; and

means for obtaining a spectrum of a difference calculated by subtracting a light reception amount of said laser beam receiving means obtained when the laser ultraviolet beam is absent from a light reception amount of said laser beam receiving means obtained when the laser beam is present on the basis of the laser beam presence/absence signal, and obtaining a temperature of the molecular or atomic radicals in the atmosphere from a pattern of the spectrum.

11. A processing apparatus according to claim 8, characterized in that said temperature measuring means measures a light emission spectrum of the molecular or atomic radicals in the atmosphere, and obtains a temperature of the molecular or atomic radicals in the atmosphere from an obtained spectrum pattern.

12. A processing apparatus according to claim 9, characterized by comprising means for causing the laser beam output from said laser beam generating means to pass through a plurality of optical paths, and to be received by said laser beam means.

13. A processing apparatus according to claim 12, characterized by comprising modulators arranged to said optical paths respectively and having modulation frequencies that are different from each other.

14. A processing apparatus according to claim 9, characterized in that

said vessel has a window through which the laser beam passes, and

said window is heated.

15. A processing apparatus according to claim 9, characterized in that

said vessel has a window through which the laser beam passes, and

said window has a cylindrical structure.

16. A processing apparatus according to claim 1, characterized in that the radicals are atomic radicals.

17. A processing apparatus according to claim 16, characterized in that the atomic radicals include any one element selected from Si, N, O, F, H, and C.